



Another Food Contaminant Hits the News, This One in Soy Sauces

Aurora Saulo Hodgson, Extension Specialist in Food Technology, Department of Tropical Plant and Soil Sciences

3-MCPD (3-monochloropropane-1,2-diol) is the most common of the group of food contaminants called chloropropanols. 3-MCPD can cause cancer in laboratory animals fed large amounts over their lifetime. Although people usually consume chloropropanols only at low levels, there is still concern that these chemicals may be a health risk.

3-MCPD has been detected at low levels in many foods and food ingredients, such as breads, savory crackers, toasted biscuits, cheeses, doughnuts, burgers, salami, malts, and modified starches. 3-MCPD is found at higher levels in some soy sauces and the savory food ingredient, acid-hydrolyzed vegetable protein (acid-HVP).

3-MCPD has probably been present in foods for a long time, but it was only recently that scientists were able to detect it reliably. Its occurrence in hydrolyzed vegetable proteins is related to the production process that uses acid hydrolysis. The source and formation of 3-MCPD in soy sauces are still being studied. There are several hypotheses on the origin of the compound in soy sauces, including the addition of acid-HVP as a savory ingredient or the use of acid hydrolysis in the food's manufacture.

Not all soy sauces contain 3-MCPD. Only about 22 percent of soy sauces tested were found to have detectable levels. The traditionally brewed soy sauces did not contain the contaminant. The Joint FAO/WHO Expert Committee on Food Additives (JECFA) has concluded that 3-MCPD is an undesirable contaminant in food and recommended that its concentration in hydrolyzed proteins should be reduced to the lowest level technically feasible.

Processing of defatted vegetable proteins produces another chloropropanol, 1,3-dichloropropanol (1,3 DCP). 1,3 DCP is found to occur less frequently than 3-MCPD, is also known to cause cancers in animals, and can damage genetic material. JECFA noted that the dose of 1,3 DCP that caused tumors in rats was about 20,000 times the highest estimated intake of 1,3 DCP by consumers of soy sauce. The available evidence suggests that the presence of 1,3-DCP is associated with high concentrations of 3-MCPD in food. Regulatory control of 3-MCPD would therefore make specific controls of 1,3 DCP unnecessary.

This year JECFA reviewed new data on both compounds and established a provisional maximum tolerable daily intake for 3-MCPD of 2 micrograms per kilogram of body weight. This tolerance includes several magnitudes of safety

factor. Although 3-MCPD is infrequently found in soy sauces, brand loyalty could result in regular consumption of contaminated brands. Regulating 3-MCPD in soy sauces could reduce consumers' exposure to this contaminant.

So far, different limits have been established for 3-MCPD based on the same general scientific studies. For example, the European Scientific Committee for Food (SCF) established a legal limit, to take effect in April 2002, of 20 parts per billion for 3-MCPD in soy sauce-type products. In contrast, Canada has set a limit on 3-MCPD of 1 part per million, which is more in line with JECFA's findings. At the U.S. Food and Drug Agency (FDA), the Center for Food Safety and Applied Nutrition considers the issue of chlorinated propanols an "open investigation" and is currently formulating an appropriate plan of action. The FDA employs expert scientists to help them review available scientific data on food safety issues, and the agency follows a conservative process to protect public health. The FDA most probably will set a limit on these contaminants in the very near future.

News reports on the 3-MCPD, which spread globally like wildfire, were based on the findings of the United Kingdom's Food Standards Agency, their equivalent to the FDA. Being a member of the European Union, UK used the European Scientific Committee for Food's very low "safe level," resulting in some soy sauce brands being labeled as containing very high levels of 3-MCPD. Some of those brands are locally available in Hawaii.

Until the FDA issues its findings, consumers can choose to take some prudent steps:

- Use a traditionally brewed soy sauce.
- If soy sauce has added hydrolyzed vegetable protein, use those brands manufactured in the USA. In 1997, the Food Chemicals Codex Monograph for acid-HVP was published. The monograph describes the specifications that are followed by the industry to limit the presence of 3-MCPD to less than 1 part per million.
- Use soy sauce in moderate amounts.

When reading news reports on scientific (or sometimes not-so-scientific) studies, consumers should remember that detection of a chemical is not automatically a violation of a tolerance level, and it does not necessarily mean that the contaminant is present in unsafe quantities.